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Scientific Imperatives Vis-à-vis Growing Inequality in America

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A landmark article published in the *American Psychologist* (Adler et al., 1994) encouraged psychologists to engage in research on socioeconomic inequality and health. Numerous contributions followed to fill in psychosocial and behavioral pathways. Specifically, we review advances on health inequalities research from a large public-use study (Midlife in the United States [MIDUS]). The Great Recession of 2007 to 2009 and its lingering effects are then reviewed to underscore widening inequality in access to education, employment, and income. Two MIDUS national samples of same-aged adults recruited 2 decades apart are then compared to assess historical changes in socioeconomic, physical health, and well-being profiles from the 1990s to postrecession. Despite historical gains in educational attainment over time, we show that indicators of socioeconomic status, health, and well-being are more compromised in the postrecession sample relative to the 1990s sample. Building on these preliminary findings, we elaborate opportunities for further inquiry by the scientific community to examine whether widening socioeconomic inequalities exacerbated by the Great Recession translate to widening health inequalities.

Keywords: socioeconomic status, health inequalities, psychosocial factors, Great Recession

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Over two decades ago, an article in the *American Psychologist* (Adler et al., 1994) advised psychologists to contribute to research on socioeconomic inequality and health. The authors described the socioeconomic gradient in health, which showed that those with lower standing in socioeconomic status (SES) hierarchies tended to have poorer health (mental and physical) as well as reduced length of life. These SES disparities in health are now commonly referred to as *health inequalities* (Marmot, 2015). In addition to describing SES and health relationships, Adler et al. (1994) called for psychologists to explicate mechanisms such as psychosocial and behavioral processes. Health behaviors (smoking, physical activity) and psychological characteristics (psychological stress, negative emotions) as well as physiological processes were proposed as promising avenues to advance the science of health inequalities. The article became a highly cited classic in research on health inequalities.

Psychologists then began to fill in psychosocial and behavioral pathways that link SES to diverse health outcomes. One pathway pertained to stress and related links to psychological distress (Matthews & Gallo, 2011). The socioeconomically disadvantaged were found to experience more negative events and chronic strains (S. L. Hatch & Dohrenwend, 2007) as well as greater emotional distress (Businelle et al., 2014). Another pathway pertained to the presence or absence of social and psychological resources (Adler, 2009). Less social integration partially explained the relationship between low education and excess stroke risk (Avendano et al., 2006), and low sense of control accounted for a proportion of the relationship between SES and cardiovascular disease (Bosma et al., 2005). Nonetheless, psychosocial resources can offset the stresses of socioeconomic disad-

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vantage (Chen, Miller, Lachman, Gruenewald, & Seeman, 2012; Donnellan, Conger, McAdams, & Neppl, 2009).

To this literature, we bring four key objectives. First, we illustrate select findings on health inequalities from a public-use national longitudinal study, known as Midlife in the United States (MIDUS), that has attracted researchers seeking to explicate psychosocial, behavioral, and biological factors that mediate or moderate links between SES and health, thereby responding to recommendations of Adler et al. (1994). Second, we bring into high relief the changing historical context within which health inequalities are studied, drawing on recent evidence from economists showing that socioeconomic inequality in America is getting worse over time, in part related to lingering effects of the Great Recession disproportionately borne by the SES disadvantaged. This changing societal context calls for new science that compares representative samples of Americans situated at different points in historical time. Third, we provide a window on this changing historical stage by comparing two cross-sectional MIDUS samples of same-aged adults recruited 20 years apart, from the mid-1990s to postrecession. Preliminary findings show more compromised SES, physical health, and psychological profiles at postrecession. Building on these outcomes, our fourth objective is to put forward new scientific imperatives to test whether and how growing socioeconomic inequality is translating to worsening health inequalities. The overarching aim is to renew the call of Adler et al., but with a sense of urgency, given ever-more-diminished life opportunities among disadvantaged segments of American society.

MIDUS Contributions to the Science of Health Inequalities

The MIDUS national study (www.midus.wisc.edu) was launched in 1995 with a national sample of over 7,000 adults aged 25 to 74 years (Brim, Ryff, & Kessler, 2004) on whom detailed information was collected on sociodemographic and psychosocial factors, life stresses, and health. Funded by the John D. and Catherine T. MacArthur Foundation, the study brought together psychologists with demographers, epidemiologists, and sociologists, thereby affording a unique look at the interplay of factors involved in health inequalities. A decade later, with funding from the National Institute on Aging, a longitudinal follow-up was launched and included new data collection on cognition, biomarkers, and affective neuroscience. We focus on select findings (about 20% of 135+ publications) on health inequalities, giving primary attention to investigations that included psychosocial, behavioral, or biological factors, thereby responding to earlier calls to incorporate these influences (Adler et al., 1994; Matthews & Gallo, 2011; S. E. Taylor & Seeman, 1999). Further, we chose recent findings from high-visibility journals in psychology or behavioral medicine, given that biomarkers were obtained in MIDUS at the second wave.

The first column in Table 1 lists multiple indices of SES. This diversity reflects the larger area of literature on SES and health inequalities. Adler et al. (1994) formulated SES as a multidimensional construct that incorporates facets of work status (occupation), economic status (income), and social status (education). In MIDUS, education was the most commonly studied indicator of individual-level SES. As described in previous literature (Marmot et al., 1998), education is a desirable indicator of SES because it is considered the most basic component of SES that sets the stage for future occupational and income opportunities, and it is less prone than income or wealth to missing data. Alternatively, Adler et al. noted limitations of restricting SES to single individual-level indicators and called for consideration of multiple sources of SES disadvantage. Accordingly, MIDUS researchers have incorporated composite indicators of SES that include education, income, occupation, and subjective financial well-being (e.g., Zilioli, Imami, & Slatcher, 2015). Other studies have taken a life-course approach to SES and health through assessments of early childhood SES compared with adult SES (e.g., Chen et al., 2012; Gruenewald et al., 2012). Researchers also attended to contextual-level influences, such as neighborhood SES (Robinette, Charles, & Gruenewald, 2017). Comparisons of subjective ratings of social status with objective SES indicators (Kan et al., 2014) also gained in prominence. Adler et al. also recommended emphasis on how both race and SES operate to influence health. Several studies using MIDUS have also been attentive to racial disparities in

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health (e.g., Fuller-Rowell et al., 2016; Karlamangla, Friedman, Seeman, Stawksi, & Almeida, 2013).

Table 1 focuses on three primary outcomes: physical health, psychological health, and biomarkers. Within each category, studies (organized alphabetically by author) show the indicator of socioeconomic inequality that was examined and key findings obtained, including whether mediating or moderating influences were identified. Details of each study (e.g., covariates employed, cross-sectional vs. longitudinal analyses) and strength of relationships are available in the published studies.

Different indicators of SES predicted numerous physical health outcomes (e.g., chronic conditions, functional limitations, obesity, mortality) and health behaviors (e.g., smoking, sleep), and many studies included mediating or moderating influences. Personality traits (conscientiousness, agreeableness, neuroticism) mediated the link between low parental occupation and obesity (Chapman, Fiscella, Duberstein, Coletta, & Kawachi, 2009). Conscientiousness buffered against the risk of smoking among those with lower educational attainment (Chapman, Fiscella, Duberstein, & Kawachi, 2009). Low childhood SES and greater childhood abuse predicted more chronic conditions, higher obesity, and smoking risk in adulthood (Ferraro, Schafer, & Wilkinson, 2016). Poorer neighborhood SES explained poorer sleep quality among minorities (Fuller-Rowell et al., 2016). According to daily diary data, low education was associated with higher cumulative daily stress exposure and excess levels of binge drinking (Grzywacz & Almeida, 2008). Genetic factors were stronger predictors of chronic conditions and body mass index (BMI) among individuals with lower sense of control and lower income (Johnson & Krueger, 2005). Among women, low childhood SES predicted higher incidence of heart problems in adulthood, with effects mediated by an early maternal transition to parenthood (Lee & Ryff, 2016). Sense of control buffered against the risk of mortality among adults with low education (Turiano, Chapman, Agrigoroaei, Infurna, & Lachman, 2014).

Turning to psychological health, low educational status predicted greater distress and physical health symptoms, with effects mediated by daily stress exposure and appraisal (Almeida, Neupert, Banks, & Serido, 2005). Low educational status also predicted poorer cognitive functioning, although frequent cognitive activity buffered against cognitive decline (Lachman, Agrigoroaei, Murphy, & Tun, 2010). Low SES predicted more frequent anger expression, with effects mediated by frustration (Park et al., 2013). Low income predicted greater anxiety, depression, and panic attacks (South & Krueger, 2011). Both low maternal education and adult SES independently contributed to low sense of control (Ward, 2013).

Biological measures were collected on over 1,200 respondents at MIDUS 2. Minority status and lower adult SES predicted flatter (less healthy) diurnal cortisol slopes, with such links modified by perceived discrimination (Fuller-Rowell, Doan, & Eccles, 2012), life satisfaction (Zilioli et al., 2015), and sense of control (Zilioli, Imami, & Slatcher, 2017). Low education and minority status predicted elevated inflammation. Higher levels of psychological well-being (Morozink, Friedman, Coe, & Ryff, 2010), higher conscientiousness and low neuroticism (Elliot, Turiano, & Chapman, 2017), and higher levels of optimism, perceived control, and self-esteem (Elliot & Chapman, 2016) buffered the effects of lower adult SES on elevated inflammation. Higher levels of anger amplified the association between low education and elevated inflammation (Boylan & Ryff, 2013). Among African Americans, high anger expression predicted elevated inflammation among those with higher educational status (Boylan, Lewis, Coe, & Ryff, 2015). High levels of lifetime discrimination predicted elevated systemic inflammation (Stepanikova, Bateman, & Oates, 2017).

For cardiometabolic health, sleep mediated the effects of minority status on elevated cardiometabolic risk (Curtis, Fuller-Rowell, El-Sheikh, Carnethon, & Ryff, 2017). Among women, minority status predicted poorer glucose metabolism, with the effects mediated by anxiety (Tsenkova, Albert, Georgiades, & Ryff, 2012). Lower childhood SES and adult SES increased diabetes risk, with effects mediated by waist circumference and depression (Tsenkova, Pudrovska, & Karlamangla, 2014). Low parental educational standing also increased metabolic risk, with maternal nurturance serving as a protection against such heightened risk (Miller et al., 2011).

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Five studies measured allostatic load, a summary index of wear and tear on multiple physiological systems. Low parental education predicted higher allostatic load, with effects buffered by a shift and persist appraisal style (Chen et al., 2012). Low childhood and low adulthood SES combined predicted the highest risk of allostatic load (Gruenewald et al., 2012). Among women, low childhood SES and minority status predicted greater physiological dysregulation across multiple systems, with effects mediated by childhood abuse (Lee, Coe, & Ryff, 2017). Discrimination contributed to elevated allostatic load in African Americans (Ong, Williams, Nwizu, & Gruenewald, 2017). Lower adult SES predicted greater allostatic load, with effects mediated by perceived discrimination and anger control (Zilioli, Imami, Ong, Lumley, & Gruenewald, 2017).

Taken together, the review of MIDUS findings illustrate multiple advances linking indicators of SES in childhood and adulthood to diverse health outcomes in adulthood. Guided by multiple conceptual frameworks, researchers have illuminated psychosocial, behavioral, and biological pathways. Life-course pathway models emphasize how early life experiences shape socioeconomic, psychological, and behavioral trajectories that have downstream consequences for health (e.g., Power & Hertzman, 1997). MIDUS findings for childhood SES indicated that early life disadvantage had long-lasting impacts on adult health (e.g., Chapman, Fiscella, Duberstein, Coletta, et al., 2009; Gruenewald et al., 2012). The *stress proliferation* life course model posits that early life adversity increases exposure to subsequent stressors (e.g., Pearlin, Schieman, Fazio, & Meersman, 2005). Cumulative exposure to life stressors then leads to declines in emotional and physical health through stress-mediated biological disturbances (Cohen, Gianaros, & Manuck, 2016). Consistent with these frameworks, childhood abuse explained relationships between childhood SES and adulthood physiological dysregulation (Lee et al., 2017).

The *reserve capacity model* (Matthews & Gallo, 2011) underscores the importance of the presence or absence of protective psychosocial resources in addition to experiences of stress and negative emotions. In line with the reserve capacity model, early life protective factors were found to dampen the influence of early life adversity on health. High levels of maternal nurturance protected against higher risk of metabolic syndrome associated with low childhood SES (Miller et al., 2011). In adulthood, psychosocial resources mitigated the negative impacts of SES on health. Higher levels of conscientiousness, sense of control, and well-being predicted better biological functioning among the SES disadvantaged (e.g., Elliot et al., 2017; Morozink et al., 2010; Zilioli, Imami, & Slatcher, 2017; Zilioli et al., 2015). In further support of the reserve capacity framework, negative emotions (anxiety, depression, and anger) contributed to SES and race disparities in health (Boylan & Ryff, 2013; Tsenkova et al., 2012, 2014; Zilioli, Imami, Ong, et al., 2017).

MIDUS findings also underscore the importance of including both race and SES in health inequalities research. Stress exposures, including interpersonal (discrimination) and environmental (poor neighborhood environment), were linked to a wide range of health outcomes that were patterned by both race and SES. For example, low education and minority status were both independent predictors of dysregulation in diurnal cortisol (Karlamangla et al., 2013). Among African Americans, unfair treatment predicted greater allostatic load, regardless of educational attainment (Ong et al., 2017). Poor neighborhood environment was also linked with poorer sleep quality in African Americans (Fuller-Rowell et al., 2016). Sleep is increasingly recognized as a behavior fundamental to health, with MIDUS findings showing that sleep time and efficiency accounted for race disparities in cardiometabolic risk (Curtis et al., 2017). Further, psychological factors such as anger expression were shown to exacerbate health risk among high-SES African Americans but not high-SES Whites (Boylan et al., 2015). In summary, race and SES represent distinct processes of social stratification and health inequalities. The next section highlights the changing historical context surrounding research on health inequalities.

Deepening Inequality in America

The Great Recession of 2007 to 2009 produced radical change in the U.S. economy, with poverty rates rising from 33 million in 2005 to more than 48 million in 2012 (Bishaw, 2013). Health correlates of job loss, unemployment, finan-

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cial strain, and recession-related hardships were documented (Burgard & Kalousova, 2015). Importantly, less advantaged groups (low SES individuals and minorities) have experienced the largest percentage declines in wealth following the Great Recession (Pfeffer, Danziger, & Schoeni, 2013). National studies have shown that less-educated adults experienced more economic hardships and had more difficulty recovering from the recession than higher educated adults (Carnevale, Jayasundera, & Gulish, 2016; Hoynes, Miller, & Schaller, 2012).

Historically, it is also worth noting that a dramatic drop in income inequality in the United States and in Europe was observed in the first half of the 20th century (Piketty & Saez, 2014), but since the 1970s, income inequality in the United States has surged back, making the United States notably more unequal today than Europe. Reeves (2018) has described the "hoarding" of the American Dream, with evidence showing that the top 20% of income earners have privileged access to better educations, jobs, income, and wealth as well as greater likelihood of stable marriages to successful partners, thriving neighborhoods, and healthier lifestyles. Graham (2017) linked such economic and life opportunity discrepancies to ever-more-compromised levels of optimism, life satisfaction, and happiness among disadvantaged segments of society. Taken together, recent economic evidence underscores that socioeconomic inequality is an ever-more-salient societal problem in contemporary America. This historical shift calls for new research. The next section uses MIDUS to compare life in the United States from two different historical periods characterized by different levels of socioeconomic inequality and access to life opportunities.

A Look Pre- and Postrecession America

The findings described in Table 1 were derived from the MIDUS baseline 1995 (prerecession) sample. Many of these individuals came of age during a historical period characterized by socioeconomic mobility and economic stability (J. Hatch & Clinton, 2000). In this section, we compare the baseline MIDUS sample with a new national sample of adults, known as the "MIDUS refresher," recruited with the purpose of evaluating impacts of the Great Recession. In contrast to the prerecession sample, the MIDUS refresher (postrecession) sample was recruited during a period of increasing socioeconomic inequality made worse by the Great Recession. Inequality in the distribution of SES indicators increased in the postrecession sample as a result of declines in income, wealth (objective SES), and financial stability (subjective SES) for those at the bottom and increases in wealth among those at the top (Glei, Goldman, & Weinstein, 2018). The comparison between the two samples affords a unique look at same-aged adults from two different temporal periods (i.e., a time-lag design), thereby offering a window on historical change in America.

Data from the prerecession baseline sample were collected from 1995 to 1996, and data from the postrecession refresher sample were collected from 2011 to 2014. Both the prerecession baseline sample (N = 3,487; aged 25–74) and the postrecession refresher sample (N = 3,577; aged 25–74) were probability samples recruited through random-digit dialing of phone numbers within the coterminous United States. Participation included a phone interview and a self-administered questionnaire (SAQ). Response rates were lower for the postrecession (59%) compared with the prerecession (70%) sample. Similarly, of those who completed the phone interview, 73% of postrecession sample compared with 87% of the prerecession sample completed the SAQ. Such declining response rates parallel changes observed for other national telephone surveys over the same period. Nonetheless, even with declining response rates, telephone surveys that are weighted to match the demographic composition of the population continue to provide accurate data on most social and economic measures (Kohut, Keeter, Doherty, Dimock, & Christian, 2012).

U.S. census current population survey (CPS) data from 1995 and 2012 provide benchmarks to compare the pre- and postrecession samples with the larger U.S. population. Both samples represented their respective population in gender, race, and marital status. However, both samples overrepresented college-educated adults—by approximately 5% for the prerecession sample and 15% for the postrecession sample. CPS data also document historical gains in educational attainment from 1995 to 2012: Over this period, the percent of college educated adults increased from 24.8% to 33.2%, and the percent of *less than high school* educated adults declined from 15.3% to 11.3%. Multivariate post-

Table 1
Illustrative Findings on Socioeconomic Inequality and Health From the Midlife in the United States Study

Indicator of inequality	Key findings
Primary outcome: Physical health, health behaviors, and/or mortality	
Parent occupation (Chapman, Fiscella, Duberstein, Coletta, et al., 2009)	• Low parent occupation → Higher adult BMI and obesity (mediated by adult SES and personality traits)
Education (Chapman, Fiscella, Duberstein, & Kawachi, 2009)	• Low education → Higher smoking risk (conscientiousness buffered smoking risk in low educated adults)
Childhood socioeconomic status (SES; Ferraro, Schafer, & Wilkinson, 2016)	• Low childhood SES & greater childhood abuse → More chronic conditions, higher obesity and smoking risk, fewer psychosocial resources
Race, neighborhood SES (Fuller-Rowell et al., 2016)	• Minority status → Poorer sleep quality (neighborhood SES accounted for race differences in sleep)
Education, daily stress (Grzywacz & Almeida, 2008)	• Low education → Higher cumulative stress exposure → Higher levels of binge drinking and negative affect
Income (Johnson & Krueger, 2005)	• Low income → More chronic conditions, higher BMI (larger genetic influence in lower income and low control)
Education, subjective social status (SSS; Kan et al., 2014)	• Education, SSS → More chronic conditions, lower self-rated health (mediated by sense of control, neuroticism)
Childhood SES, gender (Lee & Ryff, 2016)	• Low childhood SES → Higher incidence of heart problems (mediated by maternal early transition to parenthood)
Neighborhood SES (Robinette, Charles, & Gruenewald, 2017)	• Low neighborhood income → Lower incidence chronic conditions
Education (Turiano, Chapman, Agrigoroaei, Infurna, & Lachman, 2014)	• Low education → Higher mortality risk (sense of control buffered mortality risk)
Primary outcome: Psychological health	
Education (Almeida, Neupert, Banks, & Serido, 2005)	• Low education → Greater distress and physical health symptoms (mediated by daily stress exposure and appraisal)
Education (Lachman, Agrigoroaei, Murphy, & Tun, 2010)	• Low education → Low cognitive functioning (frequent cognitive activity buffered cognitive declines)
Adult SES (Park et al., 2013)	• Low SES → More anger expression (mediated by frustration)
Income (South & Krueger, 2011)	• Low income → More anxiety, depression, and panic attacks
Parent education (Ward, 2013)	• Low maternal education & adult SES → Low sense of control
Primary outcome: Biomarkers	
Salivary cortisol	
Race (Fuller-Rowell, Doan, & Eccles, 2012)	• Minority status → Flatter diurnal (less healthy) cortisol slope (moderated by perceived discrimination and adult SES)
Education, race (Karlamangla, Friedman, Seeman, Stawksi, & Almeida, 2013)	• Low education and minority status → Lower daily cortisol peak and higher nadir (flatter, less healthy, diurnal profile)
Adult SES (Zilioli, Imami, & Slatcher, 2015)	• Low SES → Flatter diurnal cortisol slope (life satisfaction steepened cortisol slope in lower SES)
Adult SES composite (Zilioli, Imami, & Slatcher, 2017)	• Low SES → Flatter diurnal cortisol slopes → Greater health symptom severity and frequency, especially at low control
Inflammation	
Education (Boylan & Ryff, 2013)	• Low education → Greater inflammation (association amplified by higher anger)
Education, race/ethnicity (Boylan et al., 2015)	• Minority status, low education → Greater inflammation (moderated by anger expression in higher educated Blacks)
Adult SES, gender (Elliot & Chapman, 2016)	• Low SES → Greater inflammation (psychological resources buffered inflammation in men)
Adult SES (Elliot, Turiano, & Chapman, 2017)	• Low SES → Greater inflammation (buffered by high conscientiousness and low neuroticism)
Education (Morozink, Friedman, Coe, & Ryff, 2010)	• Low education → Greater inflammation (psychological well-being reduced inflammation risk)
Race, education (Stepanikova, Bateman, & Oates, 2017)	• Low education, Black racial status → Greater inflammation (lifetime discrimination further predicted inflammation)
Cardiovascular and metabolic function	
Race (Curtis, Fuller-Rowell, El-Sheikh, Carnethon, & Ryff, 2017)	• Minority status → Greater cardiometabolic risk (mediated by sleep time and efficiency)
Parent education (Miller et al., 2011)	• Low parent education → Higher metabolic syndrome risk (maternal nurturance protected against heightened risk)
Race, gender (Tsenkova, Albert, Georgiades, & Ryff, 2012	• For women, minority status → Poorer glucose metabolism function (mediated by anxiety)
Childhood SES, adult SES (Tsenkova, Pudrovska, & Karlamangla, 2014)	• Low childhood SES & adult SES → Greater prediabetes and diabetes risk (mediated by depression and waist circumference)

(*table continues*)

Table 1 (*continued*)

Indicator of inequality	Key findings
Allostatic load	
Parental education (Chen, Miller, Lachman, Gruenewald, & Seeman, 2012)	• Low parental education → Greater allostatic load (shift-and-persist buffered allostatic load risk in low SES)
Childhood SES, adult SES (Gruenewald et al., 2012)	• Lower SES at each phase of and cumulatively across the life course → Greater allostatic load
Childhood SES, gender, race (Lee, Coe, & Ryff, 2017)	• Low childhood SES, women, African American status → Greater physiological dysregulation (mediated by childhood abuse)
Race (Ong, Williams, Nwizu, & Gruenewald, 2017)	• Chronic bias/unfair treatment → Greater allostatic load (relationship was not moderated by educational status)
Adult SES (Zilioli, Imami, Ong, et al., 2017)	• Low SES → Greater allostatic load (mediated by discrimination and anger control)

stratification weights (using 1995 and 2012 CPS data) are employed in the comparisons of the two samples to maximize population-level representativeness. Table S1 of the online supplemental materials provides more information on sociodemographic representation of unweighted and weighted samples.

Pre- versus postrecession sample differences were examined for three categories of outcomes. *Socioeconomic standing* included three indicators that had the fewest missing responses and had been tested in the prior literature: household income[1] ($\log_{10}$ transformed to adjust for positive skew), educational status (1 = *no school/some grade school* to 12 = *doctorate or professional degree*), and a composite measure of financial stability rated across five subjective measures (current and future financial situation, control over financial situation, money to meet needs, difficulty paying bills; Glei et al., 2018). To account for population shifts in educational achievement, a cohort-standardized index of the number of years spent in formal schooling was computed. Education was standardized by 10-year age cohorts (e.g., 25–34 in prerecession, $M = 13.72$, $SD = 2.28$; 25–34 in postrecession, $M = 15.04$, $SD = 2.53$). *Physical health* included five continuous indicators based on self-report: general assessment of health (0 = *best*, 10 = *worst*), total chronic conditions (0 to 26), BMI (range = 16 to 80), functional health (e.g., difficulty walking a few blocks, climbing stairs; range = 7 to 28) and physical symptoms in past 30 days (e.g., frequency of backaches, joint pain, trouble sleeping; range = 8–48). *Psychological factors* included continuous measures of negative and positive affect (Mroczek & Kolarz, 1998), satisfaction with life overall (0 = *worst* to 10 = *best*), six dimensions of eudaimonic well-being (Ryff, 1989), a composite measure of sense of control (Lachman & Weaver, 1998), and composite measures of the Big Five personality traits (Neuroticism, Openness, Extraversion, Agreeableness, and Conscientiousness; Goldberg, 1992).

Analyses are based on 3,034 prerecession and 2,599 postrecession respondents who completed both the phone interview and the SAQ. Missing data were imputed; analyses with and without imputed data yielded similar findings. General linear regression models tested pre- versus postrecession mean differences in outcomes. The sample was entered as a dummy-coded predictor (0 = prerecession sample, 1 = postrecession sample). Analyses adjusted for age, gender, marital status, and race. The mean difference estimates ($M_{\text{Postrecession Sample}} - M_{\text{Prerecession Sample}}$) and 95% confidence intervals were standardized with the compute.es package in R.

Figure 1 displays the standardized effect size differences between pre- and postrecession United States after adjusting for covariates. Exact values are available in Table S2 of the online supplemental materials. As expected, postrecession respondents had significantly higher educational attainment compared with prerecession respondents. However, postrecession respondents reported less total household income (after adjusting for inflation) than prerecession respondents. Financial stability was also significantly lower in the postrecession sample than the prerecession sample. Thus, despite having higher levels of education, the postrecession sample showed more compromised outcomes in income and financial stability relative to the prerecession sample.

The physical health status of the postrecession sample was also generally worse than prerecession sample. Specifically, postrecession respondents had (a) significantly worse ratings of general health, (b) more chronic conditions, (c) higher BMI, (d) more functional limitations, and (e) more frequent physical health symptoms.

For hedonic well-being, indicators of positive affect and life satisfaction were significantly lower in the postrecession sample, although the samples did not differ in negative affect. For eudaimonic well-being, ratings of autonomy, self-acceptance, and personal growth were significantly lower in the postrecession sample. Environmental mastery was the only indicator of

[1] Mean household income was based on wages, pensions, and social security. To reduce deductive disclosure of respondent identity, household income was top-coded at USD 300,000. Using the Bureau of Labor Statistics (BLS) inflation calculator, income reported in the prerecession sample was adjusted for the inflation rate from 1995 to 2012.

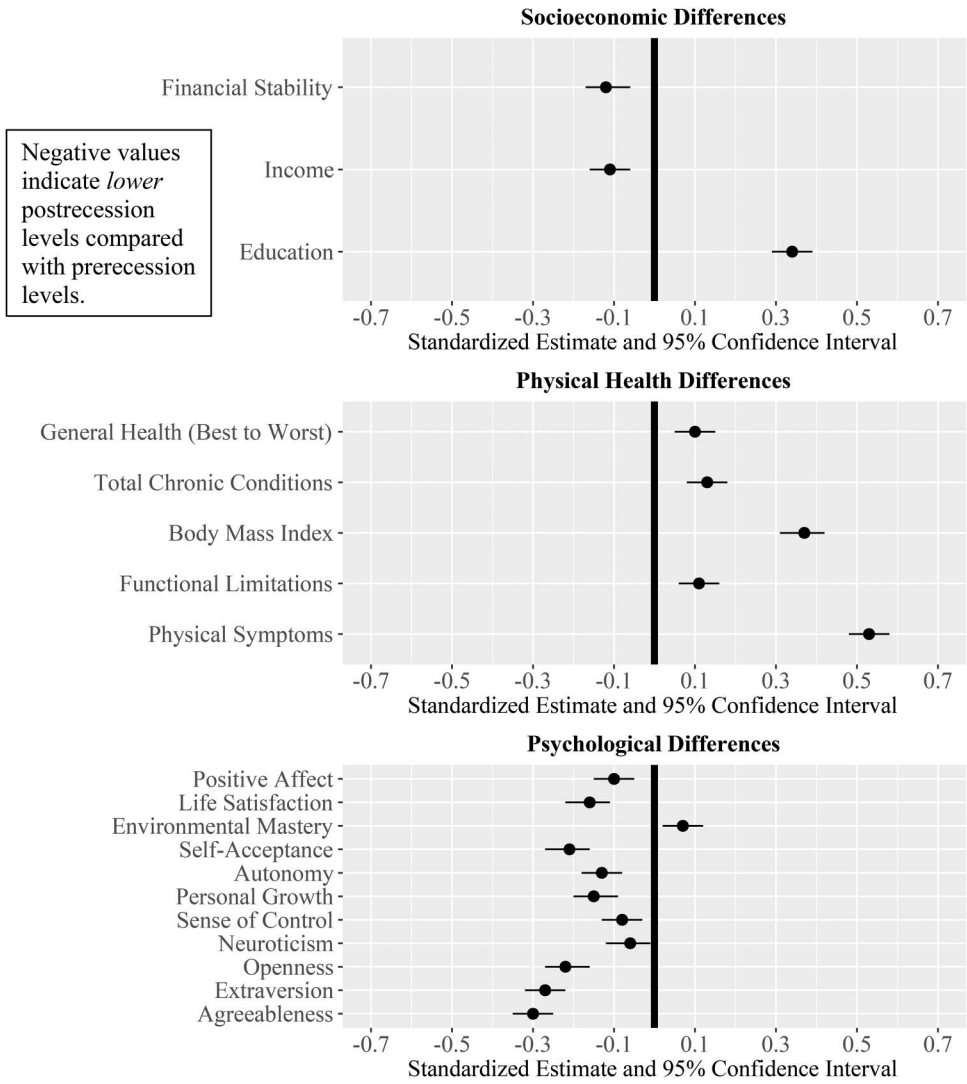

Figure 1. Standardized estimates of prerecession versus postrecession sample differences in socioeconomic, physical health, and psychological outcomes. The dots represent the estimate (Cohen's *d* for continuous outcomes). The whiskers represent the 95% confidence interval. Effects are statistically nonsignificant where the whiskers intersect with zero (vertical line).

well-being that was significantly higher in the postrecession sample, but this effect was reduced to nonsignificance when education was included in the model. Purpose in life and positive relations with others were not significantly different. Sense of control was significantly lower in the postrecession sample. For personality traits, the postrecession sample was significantly lower on ratings of openness, extraversion, and agreeableness, but not conscientiousness. Ratings of neuroticism were significantly lower in the postrecession sample, but differences were attenuated with the inclusion of education as a covariate.

The preceding differences between pre- and postrecession adults may reflect other historical changes that have occurred over time, such as globalization of the economy, obesity trends, or political factors. The postrecession sample may have also been exposed to more environmental pollutants and endocrine disruptors at critical developmental time points, thus having lasting effects on physical health.[2] Because the Great Recession disproportionately impacted

[2] Using the MIDUS 2 follow-up (2005–2006) would reduce the time window between pre-and postrecession and aid in ruling out alternative explanations. However, use of the MIDUS 2 follow-up results in analysis of adults of a more restricted age range (35–75 years) who are also more selective, given attrition over time (Radler & Ryff, 2010). For these reasons, we compare the original MIDUS baseline sample with the MIDUS refresher baseline sample. Nonetheless, follow-up analyses that substituted the baseline sample with the follow-up sample did not alter the direction or strength of the majority sample period differences reported in Figure 1.

younger adults (P. Taylor, Morin, & Wang, 2010), follow-up analyses tested age (continuous) as a moderator of sample-period differences in physical health and psychological outcomes (see Table S3 of the online supplemental materials for physical health). Age significantly moderated the sample difference for BMI and sense of control only. Pre- to postrecession differences in BMI and sense of control were greater for younger compared with older adults.

As a preliminary window on whether sample period differences might reflect growing inequality, additional analyses examined educational gradients in physical health in the two samples. We focus on educational status because it is the most commonly used indicator of SES in findings summarized in Table 1, and it has the advantage of applying to working and nonworking adults. Both unstandardized education and cohort-standardized education were significant negative predictors of each physical health outcome. Interactions between education and sample period were significant for all five physical health outcomes: general health, chronic conditions, BMI, functional limitations, and physical health symptoms (controlling for age, gender, race, and marital status). Figure 2 illustrates this pattern for BMI, showing a steeper educational gradient in the post- compared with prerecession sample. Similar patterns were observed for other health outcomes (see Table S3 and Figures S1–S4 of the online supplemental materials). Overall, the figure shows that the steepening of the educational gradient was related to more pronounced pre- to postrecession declines in health among the educationally *disadvantaged* rather than improvements in health among the educationally *advantaged*. To test the robustness of the interaction, the indicators of physical health were included as covariates. The interaction effect held for BMI, but adding the health covariates reduced the size of the interaction effect to nonsignificance for general health, chronic conditions, functional limitations, and physical health symptoms. Nonetheless, sample period main effects remained significant.

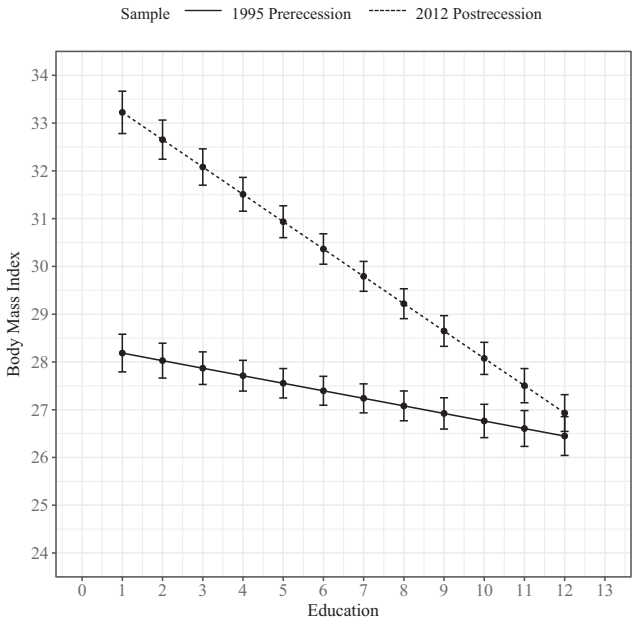

Figure 2. Displayed is a significant interaction between educational status (1 = *junior high or lower completed*; 12 = *professional degree completed*), and Midlife in the United States pre- and postrecession sample in predicting body mass index. Lines represent general linear model (GLM) predictions of body mass index by sample. Confidence interval bars (±1 standard error of point estimates from GLM) are provided to indicate the precision of the point estimates of the population means for the pre- and postrecession samples.

In sum, this preliminary descriptive comparison of two national samples situated at two different time points show more compromised profiles among same-aged U.S. adults from a decade *before* to a few years *after* the Great Recession. Despite gains in educational status, household income levels were lower and there was less financial stability. Postrecession adults showed more health problems and poorer psychological profiles. The overall picture at the population level suggests that life has gotten worse on multiple, but not all, fronts across time, and that educational gradients in health appear to have widened. More targeted analyses are nonetheless needed to determine whether health inequalities are worsening over time. What psychologists have to contribute to this tale of societal change are more penetrating analyses that illuminate individual-level profiles beneath these patterns—that is, *for whom has life become more compromised across historical time, why, and with what consequences for health?*

Advancing Historically Situated Inquiry on Health Inequalities

Economists, sociologists, and population health scientists have been at the forefront of research on the health consequences of widening socioeconomic inequality and the Great Recession. Adler et al. (1994) demonstrated that research on health inequalities requires knowledge of health and human behavior across multiple dimensions and must attend to the larger social context, thus calling for integrative approaches (see also Kirsch & Ryff, 2018). Our aim in this article has been to illustrate how the MIDUS study has been uniquely valuable in advancing the science of health inequalities in ways that are attentive to Adler et al.'s recommendations. We show how researchers using the MIDUS data have filled in psychological, behavioral, and biological pathways to health inequalities. Further, in comparing two MIDUS samples situated at different historical periods, we documented that person-level indicators of SES, physical health, and psychological health look more compromised in the postrecession sample. Building on this previous research guided by multiple conceptual frameworks (e.g., life-course pathway models, reserve capacity model), our final section

calls for new science to advance historically situated research on health inequalities.

Linking Widening Socioeconomic Inequalities to Widening Health Inequalities

The findings summarized in Table 1 link multiple indicators of SES to health inequalities, with all findings coming from assessments prior to the Great Recession. Whether historical shifts toward greater socioeconomic inequality may change the strength of relationships between SES and health is a topic ripe for future inquiry using the MIDUS postrecession data. Emerging research indicates that the physical and mental health toll of low SES has worsened over time. Case and Deaton (2015) documented widening inequalities in mortality across educational status over the past three decades. Using data from MIDUS, Goldman, Glei, and Weinstein (2018) have, in turn, shown declining mental health among recent cohorts of the socioeconomically disadvantaged relative to their more advantaged counterpart. In some instances, the more SES advantaged showed improvements in mental health over time. Such findings demonstrate the need to consider historical changes in health across the entire range of the SES gradient. Findings in the initial comparison of the pre- and postrecession samples offer preliminary evidence that education-based inequalities in self-reported physical health appear *worse* in the postrecession sample. This was largely driven by declines in physical health among the educationally disadvantaged. Such analyses need to be extended to objective indicators of physical health.

Revisiting Mediators and Moderators of Health Inequalities in the Postrecession MIDUS Sample

Previous MIDUS findings (see Table 1) have expanded on diverse psychological, behavioral, and biological outcomes theorized to contribute to health inequalities. According to the reserve capacity model, exposure to stress and negative emotions in combination with a limited reserve of psychosocial resources (social support, psychological well-being) undermines the health of low SES (see Matthews & Gallo, 2011). In prerecession findings, lower SES was tied to more acute and chronic stress exposures (Almeida et al., 2005; Grzywacz & Almeida, 2008) and more dysregulated diurnal cortisol (Zilioli et al., 2015). Historical shifts toward growing socioeconomic inequality and hardships of the Great Recession call for reexamination of the conceptual linkages between SES and health proposed in the reserve capacity model. National studies have shown that socioeconomically disadvantaged adults experienced greater financial losses and job strain in the aftermath of the Great Recession (Carnevale et al., 2016; Hoynes et al., 2012; Pfeffer et al., 2013). Such findings suggest that the relationships between SES and stress-mediated biological dysregulation may be more pronounced in the postrecession sample.

Turning to psychosocial moderators of health inequalities, prior findings in Table 1 showed that psychosocial resources such as conscientiousness, sense of control, and well-being were health protective in the face of socioeconomic inequality (e.g., Chapman, Fiscella, Duberstein, Coletta, et al., 2009; Elliot & Chapman, 2016; Elliot et al., 2017; Morozink et al., 2010; Turiano et al., 2014). Future research needs to examine whether such resources remain protective under conditions of heightened socioeconomic inequality. Findings from the postrecession sample showed that recession hardships (e.g., job loss, home foreclosure, financial loss) were disproportionately borne by the less educated, and further that aspects of well-being were *not* protective against poorer health (Kirsch & Ryff, 2016). These results suggest that protective resources may be undone (disabled) under notably difficult life circumstances (Shanahan, Hill, Roberts, Eccles, & Friedman, 2014). If this is the case, it is critical to assess whether prior findings showing that psychosocial resources prospectively predict better health and longer lives among the SES disadvantaged remain protective in postrecession America.

Everyday discrimination, a chronic stressor, has been linked with health among racial minorities, across all SES levels (Friedman, Williams, Singer, & Ryff, 2009; Ong et al., 2017). Economic insecurity is a highly stigmatizing experience, especially in the American cultural context, in which self-sufficiency and independence are prominent ideals (Markus & Kitayama, 2003). It is important to underscore that the Black–White economic divide in the United States has grown more stark because higher income and educational attainment among African Americans are not leading to accumulation of wealth to the same degree as they do for Whites (Shapiro, Meschede, & Osoro, 2013). Additionally, racial minorities are known to have lost disproportionately more wealth in the aftermath of the Great Recession (Pfeffer et al., 2013). Such added burdens of economic insecurity may thus be widening racial inequalities in health via heightened experiences of economic stress and discrimination. Future work needs to examine these possibilities.

Life Course Issues and Multilevel Contributions to Health Inequalities

Health inequalities across the life course. Understanding how socioeconomic inequality and losses linked to the Great Recession matter for American lives needs life course perspectives. The inclusion of childhood measures of SES in MIDUS offers opportunities to assess SES at each phase of the life course and to test models of cumulative SES disadvantage and health. According to the stress pro-

liferation model, early life adversity increases risk for future stress exposures that have downstream consequences for health. In the MIDUS core sample, early childhood SES has been linked with adverse health in adulthood, such as higher incidence of heart problems (Lee & Ryff, 2016), more chronic conditions (Ferraro et al., 2016), and greater allostatic load (Chen et al., 2012). Cumulative exposure to low SES at both childhood and adulthood predicted elevated allostatic load relative to those reporting low SES at only a single time point (Gruenewald et al., 2012). Growing socioeconomic inequality and the Great Recession may thus amplify health inequality because individuals exposed to early life SES adversity may be more vulnerable to experiences of recession hardship and declining income and occupation opportunities. Whether the effects of early life adversity on health inequalities will be amplified in the postrecession period is an important question to address in future research.

Most findings summarized in Table 1 have been limited to cross-sectional data. However, a key feature of MIDUS is its longitudinal design. The baseline (prerecession) sample has been followed for over 20 years, and it is likely there will be follow-ups for the refresher sample. Such data will permit tests of claims put forth at the beginning of the Great Recession, namely, that it was going to change the life course of some Americans (Peck, 2010). This prediction harkens back to Elder's classic work on *Children of the Great Depression* (Elder, 1998; Elder, Pavalko, & Hastings, 1991), and importantly, age differences in how their lives unfolded. In parallel fashion, it will be critical to track long-term biopsychosocial health profiles of *adults of the Great Recession*. Future waves of the postrecession (refresher) sample, compared with the longitudinal data available on the MIDUS core sample, will clarify whether the life course of some Americans was, in fact, changed relative to those lives played out in less economically difficult times.

With the assessment of longitudinal data, further questions pertain to the nature of cumulative adversity in the lives of Americans. For some, the stresses of socioeconomic inequality may become a ubiquitous feature of life that takes a toll mentally and physically. The *accumulation of risks* model posits that repeated exposures to SES disadvantage throughout the life course could amplify the adverse effects over time (e.g., Ferraro & Shippee, 2009). Age at exposure to the Great Recession and widening socioeconomic inequality may therefore be an especially salient marker of subgroup differences in health inequalities. Younger adults did experience disproportionate losses (P. Taylor et al., 2010), which could fuel problems for health and well-being, compared with older adults who had more established incomes and wealth prior to the onset of the Great Recession. Longitudinal assessments need to clarify whether historical changes in health inequalities are more pronounced in younger adults.

Multilevel approaches to health inequalities. According to the sociological model of cumulative dis(advantage), the consequences of inequality may be embedded in multiple levels of social context (micro-level, meso-level, macro-level; Dannefer, 2018). At the macro-level, inequality emerges from social and economic forces, whereas at the meso-level, it emerges from the stratification of social roles (e.g., occupation, marriage). At the micro-level, interpersonal interactions and daily experiences reinforce one's position in the SES hierarchy. Future research can fruitfully compare pre- and postrecession MIDUS samples to test how macro-level forces, like the Great Recession, influence meso-level and micro-level processes that exacerbate health inequalities. For example, MIDUS daily diary data can be leveraged to test SES differences in the consequences of the Great Recession on daily stress exposures and work and family life. Previous studies have shown that financial loss and job strain have downstream consequences on marital and family strain (Kahn & Pearlin, 2006; Sturgeon et al., 2016) and social isolation (Brand & Burgard, 2008). Additionally, prior work in MIDUS has shown that contextual factors like neighborhood SES matter for individual health (e.g., Fuller-Rowell et al., 2016; Robinette et al., 2017). Future work should consider neighborhood SES in light of postrecession home foreclosure rates and increases in poverty in vulnerable communities (Owens & Sampson, 2012).

Comparing SES Indicators and Their Relevance to Health

A unique strength of MIDUS is the inclusion of multiple indicators of SES and health. Most studies, however, have focused primarily on relating a single indicator of SES to a single health outcome. Population health scientists have suggested that objective indicators may be limited representations of SES (Braveman et al., 2005; Shavers, 2007). Future integrative work could usefully examine the unique contributions of more diverse indicators of SES and their relationship with health, particularly as tied to widening socioeconomic inequality. Researchers have noted that in the last two decades, disparities in subjective financial standing have increased to a greater extent than in objective indicators (Glei et al., 2018). According to the status anxiety hypothesis, heightened socioeconomic inequality increases the salience of one's relative position within the socioeconomic hierarchy (Layte, 2012). This heightened awareness may increase perceptions of relative disadvantage, producing negative consequences for stress and health (Adler & Tan, 2017). Sommet, Morselli, and Spini (2018) found that perceptions of financial scarcity, but not income level, strengthened the association between increasing income inequality and poorer psychological health. Whether these findings replicate for physical health outcomes needs further investigation. In sum, subjective experiences of SES

warrant greater attention. MIDUS has assessments of relative disadvantage (ladder of subjective socioeconomic status), but few studies have tested its association with objective indicators of health.

Conclusion: Pursuing the Science of Inequality on a Changing National Stage

The discipline of psychology is critical for understanding how socioeconomic inequality matters for health. This article highlights evidence from a large public-use study that has attracted widespread engagement from the scientific community. Numerous findings have shown how behavioral and psychosocial factors mediate or moderate linkages between SES and health outcomes, including biological risk factors. Novel opportunities for future inquiries follow from two national samples of U.S. adults situated on either side of the Great Recession. Preliminary findings suggest that life for many individuals has gotten worse over time relative to same-aged adults from prerecession America, but future inquiries using individual-level analyses are needed to evaluate for whom health inequalities are getting worse and why. Ultimately, high-quality science on multiple fronts is needed to address societal challenges of inequality that are now unfolding. Our intent is to nurture such inquiries.

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